

The use of landscape system approach in predicting the distribution of ecotopes: Samaria Biosphere Reserve, Crete, Greece.

Een landschap-systeem benadering voor het voorspellen van ecotopen in het Samaria Biosphere reservaat (Kreta, Griekenland).

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Summary

Lefka Ori (White Mountains) of West Crete is one of the most important areas in Europe for its endemic and rare plant species. Its unique bio-geographical setting and geological history were the reasons for a distinctive floral and faunal evolution. Although Crete and its mountains have received the attention of a number of ecological studies in the past, a lot is yet not known about the environmental factors that control the distribution of plant species and communities. Despite the large number of ecological studies, many of the factors taken into consideration are characterised as indirect and/or complex. At the same time a number of others are not investigated.

The scope of this study was to utilise methods widely used in soil survey and land evaluation in this ecologically important, mountainous region. This study suggests that the expert knowledge of a soil/landscape surveyor and the use of landscape process modelling together with GIS can:

- a) disaggregate complex landscape characteristics;
- b) offer additional inputs to ecological studies;
- c) give a spatial dimension to key environmental factors and, as a consequence;
- d) locate the ecologically important areas;
- e) recommend strategies for nature conservation.

The methodology consists of tools typically used in the fields of geology and soil sciences. Sophisticated landscape models and advanced GIS techniques were tested and implemented for the representation of relevant landscape attributes.

The information produced and incorporated in this study were:

- Topography (DEM) and climate
- Physiographic Landscape Survey
- Land cover mapping
- Hydrological modelling
- Erosion/deposition model simulations
- Landscape stability model simulations

In a later stage a multi-criteria thematic map overlay scheme was created in GIS based on literature. This led to a map with the potential distribution of plant communities within the study area.

Besides each individual aspect mentioned above, this study:

- simulated rock falls and rock flows in the area, an attempt new in the field of geomorphology;
- statistically correlated landscape attributes and processes with the presence of trees;
- presented a methodology for ecotope prediction.

This study does not argue that ecotopes have been predicted with accuracy. Such an attempt requires vegetation sampling and validation which was out of its scope. Nevertheless, this study did represent spatially all the landscape characteristics depicted as important from ecological studies. The results, adequately generalised according to the above considerations, do give recommendations for nature conservation policies. Perhaps the most promising aspect is the potential of integrating further the aforementioned scientific fields: visiting the areas sampled by vegetation scientists, representing additional landscape properties and validating the results is the general procedure for the development of an ecological prediction model.